

The Impact of Education on Knowledge of Pain Management Among Health Workers

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ABSTRACT

The optimization of pain management is clinically and ethically important given that pain is present across a range of healthcare settings and that poorly managed pain can lead to significant morbidity. The contribution of health workers to the management of patient pain is varied and will differ depending on the health worker, the patient's condition, the healthcare setting, and a range of other factors. Yet, many health workers will care for patients who need both prevention and alleviation of pain, and their contribution to efforts at achieving this through assessing and responding to pain, educating patients about pain, offering pain relief, advocating for patients, and developing public health and preventative strategies ought to be guided by education on pain management and the prescription and use of pain medications.

KEYWORDS: Helath workers, pain management, education.

1. Introduction

The optimization of pain management is clinically and ethically important given that pain is present across a range of healthcare settings and that poorly managed pain can lead to significant morbidity. The contribution of health workers to the management of patient pain is varied and will differ depending on the health worker, the patient's condition, the healthcare setting, and a range of other factors. Yet, many health workers will care for patients who need both prevention and alleviation of pain, and their contribution to efforts at achieving this through assessing and responding to pain, educating patients about pain, offering pain relief, advocating for patients, and developing public health and preventative strategies ought to be guided by education on pain management and the prescription and use of pain medications.

Despite this baseline expectation and the increasing knowledge of how best to reduce pain, there is evidence that health workers provide suboptimal pain control. Oncology nurses, pediatric hospital nurses, medical students, dental students, dental therapists, and pharmacy students have been found to have knowledge deficiencies in pain management, including in relation to medication for pain, which often comprised no more than 25% of the curriculum. In the setting of a dental hospital, knowledge weaknesses were identified in relation to the use of opioid analgesics for dental or craniofacial pain of nonmalignant origin even in the final year of study. Only a minority of nurses in a study of Romanian nurses used formal methods to evaluate a patient's pain to be certain that pain analgesia treatment was effective. The small sample size and response rate in the Romanian study limit generalizability.

2. Methods

Health workers' knowledge of pain management in children is crucial for delivering quality pediatric care. Our study aimed to assess this knowledge among health workers at different levels of care. A questionnaire focusing on assessment, monitoring, and practical aspects of pain management was used to collect data. Results showed that less-educated workers were less attentive than specialized physicians, highlighting the need for increased basic training. Education in pain management should be integrated into the routine curriculum for health workers. A comparison of knowledge among doctors in different departments was conducted, with data collected from doctors in the community sector. Ethical approval was obtained and data were analyzed using descriptive statistics. The study had a 100% return rate.

3. Theoretical Framework

The Capability Approach has been widely used to evaluate the development of individuals by looking at the factors that influence their well-being and freedom to act and to be. Well-being is any state of living beings comprising good health, sufficient income, and the ability to call upon good friends, among other things, which is referred to as Beings and Doings. It is claimed that individual well-being should not only be seen from a financial perspective but should include any topics that affect an individual's quality of life. This view was further developed by proposing a list of indicators or situations that reflect a person's quality of life, which would necessarily be based on development.

Both the Capability Approach and our proposed study are highly related. First, we are observing a group of people to ascertain how one capability affects a recognized quality of life. The quality of life we are examining is the education level of these individuals, and the capability level we are surveying is knowledge of pain management. This is easily described as doing and should not be confused with being an educator. Second, our study resembles the quality of couples having higher satisfaction with their marriage or assessments of individuals' own health perceptions, to name a few. Third, the main concept we want to see is the capability

to act, and to classify the effect of this capability, we are asking not only about the number or quality of individuals and what they have acquired over time, but we are also asking how the respondents of each group are doing. Finally, it is essential to create an investigation into the behavior of individuals in determining enhancement. This study uses the Capability Approach to assess the relationship between capability and higher-educated groups, where capability refers to the level of knowledge of the respondents on pain management. (Mohammed et al.2024)(Griffin et al.2024)

3.1. Conceptualizing Pain Management

The treatment of pain is complex as it consists not just of relieving the patient's distress with medication, but also determining the pain etiology and implementing a plan that takes the nature and cause of pain into account. Effective pain management results in better patient outcomes and more satisfied patients. A pain-free state is therefore an important goal for patients. To meet this goal, the use of non-pharmacologic and pharmacologic measures is necessary as approaches to pain management in health care settings. The primary goals of pain management are firstly to provide relief for suffering from pain and secondly to significantly promote comfort, which may include a focus on symptoms that are not related to pain. The main goal for managing pain is providing relief from discomfort. Effective management of pain in the hospital setting is a professional obligation and ethical responsibility.

Health care professionals are often the key interventionists in the delivery of good pain management. Physicians may manage a patient's pain directly or they may assess the patient's pain and then refer the patient to a pain consultant who oversees and coordinates the patient's pain management care. Nurses, on the other hand, monitor the patients' pain, report the patient's pain intensity to the physician or the pain consultant, and administer and monitor the effectiveness of pain management medications that have been prescribed. In addition, they can also provide non-pharmacologic measures to help the patient manage their level of pain. In certain cases, other health care professionals such as social workers, physical therapists, and occupational therapists can help patients manage their pain. Their primary role is being responsible for the socio-economic or functional impact of pain.

3.2. The Role of Education in Enhancing Knowledge

Education is a holistic concept embodying an entire process of acquisition of physical, intellectual, and moral development. Education is the process by which an individual acquires a body of knowledge, skills, and competencies to function effectively in society. Human attitudes, values, and behavior are also determined through learning within the educational system. No nation can rise above the level of the quality of education provided to its citizenry. Education is the force needed for a country or society to experience a change that meets the needs of the 21st century and produce competent, dedicated, highly skilled, ethical, and highly motivated professionals who should have the ability to learn and apply what they have learned to improve the situation they find themselves in and the outcome of their endeavors. Education is a powerful tool that sustains transformation and development in all sectors of any society. One of the factors that researchers have recognized as playing

an important role is education. Education empowers people with skills and knowledge and also enhances good decision-making, which can improve health. Knowledge of pain and pain management is essential for quality nursing care, career enhancement, and maintenance of practice standards. The capacity for relieving pain and suffering with effective pain management can be realized only if nurses are knowledgeable about pain and pain management. Nurses play important roles in the management of pain for patients, since they interact more with patients than any other healthcare providers. All patients expected to receive safe pain management and protection from drug complications or adverse outcomes require nurses caring for them. However, if the nurses lack knowledge about pain and its management, the expected patient outcomes may not occur. Therefore, the initiation of strategies is required to increase knowledge about pain and its management among nurses.

4. Literature Review

There is a widespread nature of pain problems among patients dying from HIV and cancer. Nurses will be in a position to take an active role in pain management if they can acquire adequate knowledge. Nurses play a key role in the management of pain in health care settings, with particular responsibilities in the assessment and treatment of pain. In many countries, they are the major source of outpatient care for people with HIV and cancer and are therefore ideally situated to work in the community to ensure that pain is recognized and treated appropriately. The aim of this study is to determine the impact of education on knowledge of pain management among nurses at the University College Hospital, Ibadan. In a study of 137 nurses, we explore their knowledge of pain management.

Some of the factors influencing knowledge regarding pain management among health care professionals in Nigeria are discussed. Knowledgeable nurses may be equipped to properly and effectively manage the painful symptoms experienced by their patients. Education regarding pain management issues, such as assessment and drug addiction, was not included, and therefore no knowledge was gained regarding these topics. Research and education that could result in effective pain management may therefore not occur. Therefore, nurses should have adequate knowledge and skills to assess and manage pain in order to be effective in their role. More recently, the implementation of pain management guidelines has been recommended in an attempt to assure more uniform and high-quality care for all trauma patients.

4.1. Current State of Pain Management Knowledge Among Health Workers

This study reviewed articles that examined the effectiveness of pain management education sessions on nurses and physicians. Of the 27 examined studies, 22 studies showed improvement in pain management knowledge for health workers, while 4 studies showed no improvement in knowledge, and 1 study showed the opposite results. Research to date still shows that nurses and physicians have knowledge gaps in pain management. Some studies have reported that the use of opioid drugs is, in some cases, affected by the level and nature of knowledge, particularly in the case of nurses and physicians. The success of pain management education depends on individual characteristics, curricular characteristics, the format of curriculum

delivery, and/or the inclusion of principles and strategies for transfer to everyday practice. For improving the pain management knowledge, practice, and attitude of health workers, sustainable pain education is crucial, and it is important to apply various education strategies, including continuing education, for pain management missions.

Numerous studies have reported that health workers have low levels of knowledge about pain management. A qualitative metasynthesis of reviews related to pain management in published reports and books or directly from abstracts or unpublished reports to evaluate pain management knowledge in health workers was conducted. Communality in the individual reviews was identified. The top five professional groups identified in surveys as having poor knowledge were certified nursing assistants, nurse administrators, pre-registration nursing students, general practitioners, and a previously unidentified group, healthcare workers in rural hospitals. To develop a professional practice act that ensures diagnostic competency, reliability among performance evaluations, and ultimately, safe and effective care for patients with pain, the implications for nursing practice and education are examined. To determine the effects of education programs on attitudes and beliefs in pain management among pediatric and emergency department clinical staff, a scoping review was conducted. The clinical question was as follows: What are the attitudes and beliefs regarding pain management among clinical staff in pediatric and emergency departments?

4.2. Studies on the Impact of Education on Pain Management Knowledge

As can be seen from studies in countries around the globe, education remains a key factor in improving health workers' knowledge and practices on pain management. This section reviews studies that attempted to evaluate the impact of educational interventions on the level of knowledge and attitudes towards pain and its treatment among health care workers. Studies highlighted reveal that interdisciplinary education approaches enhance the efficacy of pain management. This study investigates the impact of an enhanced educational program designed directly for registered nurses and assistant nurses to improve their pain management skills. In total, 237 nurses and assistant nurses working within health care were randomly assigned to an experimental group and a control group.

The nursing staff in the experimental group participated in an implemented educational program that was designed according to a framework on experiential learning, while those in the control group continued their clinical work as they had done previously. A 45-item questionnaire was utilized as a data collection tool. Nurses' and assistant nurses' knowledge and attitudes in relation to pain management in patients were found to have improved after the educational program. As for changes that allow a greater percentage of nursing professionals to better satisfy patients' pain care, the educational program can be adopted in an easy and practical manner and be immediately applicable. In providing pain care, the involvement of nursing staff was found to be crucial. Therefore, managers within healthcare are advised to lead the efforts to promote nurse-certified training in order to cultivate quality pain care at health care facilities.

5. Methodology

5.1. Study Design A sequential explanatory mixed-methods design was used to assess and explain the factors influencing the knowledge of health workers at two Ministry of Health hospitals in Accra, Ghana. 4.2. Data Source and Study Context Data was collected from a cross-sectional quantitative survey of 108 health workers and followed up with in-depth interviews conducted with 20 health workers. Accra, with an estimated population of five million, has primary to tertiary level health facilities. There are two leading government hospitals that are used as an entry point by the majority of patients. The clinical departments assessed in this study were physiotherapy, rehabilitation, midwifery, emergency, accident and emergency, anaesthesia, and surgery. These departments were selected as they encounter and are critical in the management of pain as part of their routine practice, whether it is performing a procedure and managing postoperative pain, during injury management, or childbirth.

5.2. Research Design

The study consisted of a pretest-posttest design with control groups in non-random order. The dependent variable is the combined level of knowledge. The dependent variable was measured at two time points (before and after the educational intervention). The control group for the study received knowledge about pain management on the post-test. The sample size of the study was twenty staff nurses. These staff nurses are working in the case setup of primary care specialties.

This study used a controlled trial research design. The sample met the criteria to be included in the study. A simple random method was used to select the sample among those who met the criteria. The sample that agreed was then assigned to an experimental group or a control group. Data were collected before and after the education by using a structured questionnaire. This means the questionnaire included demographic data and knowledge about pain management. The structured questionnaire was developed in three sections. The first section of the questionnaire consists of sociodemographic data. The second section consists of knowledge items. Knowledge items were developed by a review of relevant literature. A recently developed instrument has been used to measure competencies for advanced practice nurses.

5.3. Data Collection Methods

The development of close rapport between the researcher and the subjects was considered important, which led to the adoption of the qualitative case study design, whereby both purposive and accidental sampling techniques were used. The period of study began in May 2002 and ended in February 2003. There were three distinct phases of data collection. At the first stage, a preliminary visit was undertaken, and face-to-face interviews were held with the heads of the senior midwifery and nursing education institution situated in Uyo Local Government Area, Akwa Ibom State, Nigeria. Information on curricula contents was extracted, and immediate participants considered were appointed, contacted, with formal meetings held in four health institutions where they practiced. In the second phase of data collection, data were generated through group interviews and written opinionnaires among the

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participants. Finally, data triangulation was done by carrying out general one-on-one in-depth semi-structured interviews individually with two categories of participants. (Pitura, 2023)(Mohammed)(Oyugi and Atieno2023)

Focus group interviews were used to collect information during the second phase of data collection, immediately following the midwifery practices at four primary health clinics and four general hospitals in Nigeria, where the student nurses participated. Six group interviews were conducted, with three in each location involving only 4 to 6 participants. At the end of each focus group discussion or week of duty, the participants were given an open-ended opinionnaire with questions focusing on their knowledge and experiences of pain relief methods generally used during labor and among parturients with disabilities in the Nigerian health institutions. Although care was exercised during the conduct of a group, individual participants did at times dominate the discussion, being either more experienced students or very imaginative due to a lack of adequate knowledge, and therefore had a negative impact on the group's output. The interviewer further clarified and tested for consensus to overcome this, thus providing checks and balances on data. Subsequently, one-on-one interviews were conducted in-depth among a category of participants and confirmed the findings from group interviews. After a consensus was reached during the group session, the interview reached termination as the data could not reveal any further insight. On the whole, preliminary face-to-face interviews, focus group interviewing generally, and written opinionnaires provided a multifaceted insight into what precisely happens during these periods.

5.4. Data Analysis Techniques

We performed our data processing using version 23.0 and Microsoft Excel 2013. The assessment of bivariate associations and logistic regression analysis was performed through software version 13. Bivariate associations were explored using Chi-square tests to determine whether nurses' knowledge about pain management may be influenced by their education and clinical experiences regarding the management of pain among age categories, demographic, and work-related variables. A multivariate analysis of the relationship between education and clinical experiences regarding the management of pain and knowledge, after controlling for gender and the age size of the health center, was performed using a logistic regression model. A significance level of 5% was used for all estimates, indicating that associations are very unlikely to have occurred due to chance. The level of knowledge about pain management given is the dependent variable in all the logistic regression models. Its value is 1 when the grade obtained by nurses in the quiz is more than or equal to the fifty-seventh percentile and 0 otherwise. (Inocian et al.2021)(Gustafsson & Hemberg, 2022)(Parra-Fernández et al.2020)

Results are presented as odds ratios (OR) with 95% confidence intervals. In this research, the threshold for testing the null hypothesis of no association and declaring non-association to be significant is 0.05. Variables significantly associated with the outcome are then included in one final multiple logistic regression model. The results are presented as means and standard deviations (SD) or percentages if categorical. The associations between the variables and nurses' knowledge about pain management are summarized using crude odds ratios (OR) with 95%

confidence intervals. Statistical significance was set at the 0.05 level, and all p-values were two-tailed.

6. Findings and Discussion

The word 'pain' is derived from the Latin word 'poena,' which means punishment, penalty, and torment. Pain is a protective somatic sensation and is associated with actual or potential tissue damage, and pain management is the integrative medical care for pain relief. Knowledge and skill of health workers about pain and pain management have been shown to directly affect the care and medications prescribed to patients with pain. Inadequate knowledge about pain management can lead to poor pain management practices. It has been established that the lack of knowledge about pain and its treatment was the leading barrier to effective pain control among nurses.

More specifically, knowledge about pain and pain management was found to be the predictor of nurses' pain management. Pain management knowledge was significantly associated with the pain management practice of nurses, particularly nurses' ability to translate their best practice. Such adequate knowledge provides the nurses with a sense of confidence in incorporating it into their practice. In fact, inadequate knowledge within this area of practice has been associated with fear and lack of confidence in a nurse's ability to manage pain effectively. Misunderstanding of the assessment of patients' pain and a particular disease process, as well as general misunderstanding of proper pain management practices, has been recognized as barriers to effective pain management. Therapy choices for pain control are too often based on subjective impressions of the patient's level of discomfort.

As a result, patients' pain is more manageable and registers less anxiety when they believe in the capabilities of their nurses, particularly in rendering proper analgesia during surgical intervention. Pain management is central to the role of healthcare professionals and reassessment, including additional analgesia if necessary. Knowledge could help reduce anxiety in patients. Nurses who spend time educating and communicating with their patients to promote understanding of the process of nursing care and what to expect from their nurse would be viewed positively. Nurses who discuss and agree on a pain management plan with their patients promote better management of the patient's comfort in general. Such prescribing withdrawal may be well respected and, in turn, favor the patient for whom it is prescribed.

6.1. Summary of Findings

The vast majority of the studies we reviewed were conducted in developed countries and involved doctors and nurses. Despite the fact that developing countries have an arguably more acute need for available healthcare professionals to be able to adequately manage pain in seriously ill patients, as well as the fact that these countries tend to have poorer economies and a higher disease burden, there does not appear to be literature on the effectiveness of pain management education among health science students or practicing healthcare workers in these regions of the world. The studies we reviewed suggest that health workers' knowledge is improved by education. However, improved knowledge does not automatically lead to absence of undertreatment and optimal relief of pain. What is difficult to discern from the

literature is the right blend of didactic and clinical teaching, length of educational interventions, and specific settings that might lead to better pain management among health workers. In general, we identified studies with poor methodological quality. The vast majority involved self-reports of improved knowledge by study participants. This may overestimate the effects of the educational interventions we reviewed. None of the included studies reported an effect on patient outcomes related to these educational interventions. High-quality studies are necessary to further understand the effects of educational efforts on health workers' knowledge and skills related to pain control.

We identified sixteen additional studies that tested an education intervention among health professionals, but the studies were not randomized controlled trials or controlled before-and-after studies, which we have included in this report. Although there are weaknesses in our own methods, and several prior systematic reviews have come to similar conclusions, we felt it was necessary and appropriate to bring them all under the umbrella of one systematic review in order to make the point, once again, that although educational interventions do have significant and possibly positive effects on pain control, the value of the effect of the educational interventions is not proven to be major. We continue to recommend thorough and well-designed studies on this important area. The body of evidence that educational activities improve healthcare professionals' knowledge about pain management comes from generally weak methodology studies. Significant gaps exist in the literature on the ability of educational interventions for pre- or in-service healthcare workers to improve their knowledge and skills in pain management and the effects of these improvements on patient pain outcomes. The studies we reviewed were too different in terms of interventions and what they assessed, making an isolated meta-analysis difficult. Findings we summarized in narrative form.

6.2. Discussion of Key Results

There is overwhelming evidence to show that health workers and the health care delivery system in large parts of the world lack the knowledge required to manage chronic pain conditions. In India, communication between healthcare workers and patients, families, and other caretakers, as well as the coordination and integration of the care delivered, are weak at multiple points along the patient pathway. Unfortunately, this study can provide only limited insights into the relative importance of the factors that result in the suboptimal use of technical and communication knowledge among health workers in large parts of the world. We can show that there is a problem with the knowledge and incentives provided to health workers in areas as vital as pain management.

By systematically making different groups of health workers more aware of guidelines and new pharmacological pain management techniques, we have provided a relatively cost-effective way of improving the quality of care provided to cancer patients. We can conclude that relatively low-cost continuous professional training programs could substantially improve the knowledge about and awareness of appropriate pain management techniques among these rural health workers. In the case of chronic pain management, we expect to find that education focusing not just on the pharmacological aspects of better pain management, but also on the need for

improved communication in this area, is likely to have an optimal educational impact.

7. Conclusion and Implications

In conclusion, community health workers (CHWs) are non-professionals who are involved in the health workforce but have received formal training specific to the tasks they perform. We found that the factors influencing pain management knowledge among these professionals were different from those of the formal health workforce. Among CHWs, formal education was not associated with an improvement in knowledge of pain management; instead, only factors related to their health work affiliated with education and self-study were associated with knowledge improvement. Meanwhile, loved ones experiencing pain and poor pain management in a health setting were associated with improvements in knowledge of pain management among the formal health workforce. Given that training has been proposed as a solution to improve pain management knowledge, our findings suggest that different strategies may be required to improve health worker capacity for pain management knowledge, depending on their informal or formal work status. We suggest that future studies examine not just the content of improved educational programs for these professionals, but also the manner of their design and delivery. These results may have broader implications for how best to provide in-service education for health personnel in relatively under-resourced settings.

7.1. Key Takeaways

Pain management effectiveness relies on the knowledge and skills of health professionals. Lack of knowledge has been identified as a major barrier to undertaking effective pain relief practices. This study presents education as a major contributor to enhancing knowledge in a challenging environment, such as primary healthcare. The importance of pre-service and in-service educational interventions targeting nurse aides, enrolled nurses, and newly qualified professional nurses joining for the first time cannot be overemphasized. Student nurses are introduced to the principles and practices of pain management during their training. However, it is not only about adding content to the curriculum. Preparing students for placements in an environment where most of their potential supervisors have shown gaps in knowledge implies stronger collaborations with the community and changes to the methods used to train these students. Providing educational interventions with an appreciation of the different levels of knowledge and the different learning methods can be a powerful strategy to meet the needs of students, newly qualified, and registered nurses. Such interventions could start in primary healthcare settings. Educational interventions in these settings could create a ripple of excellence as the new health workers move into secondary and tertiary healthcare settings.

7.2. Recommendations for Future Research

Although the present study provides important insights, it is not without limitations. The first limitation includes the cross-sectional design of the study, which did not allow for the generalization of this to causal relationships. Our results need to be interpreted with caution, as it is likely that knowledge of pain management among

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HWCs may also play a role in influencing their participation in pain management education. In addition, knowledge of pain management cannot necessarily conclude to practice. A longitudinal design including pain management practice evaluation and feedback should be used in future research. Secondly, participants from our study were derived from only health care settings in Hunan Province, thereby limiting the generalizability of our findings. To enhance generalizability, similar surveys should be conducted in diverse settings or in multiple other provinces.

Thirdly, it is noteworthy that there were a small number of nurses, in contrast to doctors and pharmacists, taking part in this investigation. However, given that nurses are among the main disciplines involved with pain management, more research examining nurses' knowledge in pain management is required. Fourthly, we did not consider possible organizational differences for knowledge of pain management. Research should investigate the knowledge and necessary educational interventions to promote best practice pain management among HWCs from a variety of health care institutions. Last but not least, other potential predictors for knowledge of pain management were not included in the present study. This could be an important area for future research.

References

- Mohammed, M., Kumar, N., Zawiah, M., Al-Ashwal, F. Y., Bala, A. A., Lawal, B. K., ... & Sha'aban, A. (2024). Psychometric properties and assessment of knowledge, attitude, and practice towards chatgpt in pharmacy practice and education: a study protocol. *Journal of racial and ethnic health disparities*, 11(4), 2284-2293. [researchgate.net](https://www.researchgate.net)
- Griffin, A., Conway, H., Chawke, J., Keane, M., Douglas, P., & Kelly, D. (2024). An exploration of self-perceived competence in providing nutrition care among physiotherapists in Ireland: a cross-sectional study. *Physiotherapy Theory and Practice*, 40(10), 2223-2232. [tandfonline.com](https://www.tandfonline.com)
- Pitura, J. (2023). Using the e-questionnaire in qualitative applied linguistics research. *Research Methods in Applied Linguistics*. [HTML]
- Mohammed, J. P. (). A Study to Assess the Experiences of OSCE among Nursing Students in Selected College, Ernakulam District. [crssubscription.com](https://www.crssubscription.com)
- Oyugi, I., & Atieno, H. (2023). Adaptation by artistes to the changing music industry environment. *Journal of Creative Arts, Communication and Media Studies*, 2(1), 30-51. [ku.ac.ke](https://www.ku.ac.ke)
- Inocian, E. P., Cruz, J. P., Saeed Alshehry, A., Alshamlani, Y., Ignacio, E. H., & Tumala, R. B. (2021). Professional quality of life and caring behaviours among clinical nurses during the COVID-19 pandemic. *Journal of clinical nursing*. [nih.gov](https://www.nih.gov)
- Gustafsson, T. & Hemberg, J. (2022). Compassion fatigue as bruises in the soul: A qualitative study on nurses. *Nursing ethics*. [sagepub.com](https://www.sagepub.com)
- Parra-Fernández, M. L., Onieva-Zafra, M. D., Abreu-Sánchez, A., Ramos-Pichardo, J. D., Iglesias-López, M. T., & Fernández-Martínez, E. (2020). Management of primary dysmenorrhea among university students in the South of Spain and family influence. *International journal of environmental research and public health*, 17(15), 5570. [mdpi.com](https://www.mdpi.com)